A STUDY OF THE SPELLING ACHIEVEMENT OF RURAL HIGH SCHOOL PUPILS

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By

Doreen P. McKay

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A STUDY OF THE SPELLING ACHIEVEMENT OF RURAL HIGH SCHOOL PUPILS

A DISSERTATION

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DIVISION OF EDUCATIONAL PSYCHOLOGY

by

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EDMONTON, ALBERTA

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UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned hereby certify that they have read and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "A Study of the Spelling Achievement of Rural High School Pupils," submitted by Doreen P. McKay in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

The purpose of this study was to measure the spelling ability of rural high school students, especially with reference to the words they have been taught in the elementary school. The sub-problems related to the main study were comparisons of the spelling ability of the boys and girls and of the spelling ability of the bilingual and unilingual students. The effect of the socio-economic factor on the achievement in spelling was also investigated.

A 398 word spelling test of the dictation type was constructed, using words chosen by random samplings from the spellers of the elementary grades. This test was administered to 568 high school students from twenty-one schools in three school divisions. In addition to the test, each student supplied information on a data sheet as to grade, sex, bilingualism, and socio-economic status.

Only 525 students completed the test and the test papers were all scored by the investigator. The number of spelling errors constituted the student's score. The mean error scores of the frequency distributions of the various groups investigated, the high school grades, the boys and girls, the bilingual and unilingual groups, the socio-economic groups, were compared, and the significance of the differences established.

The results showed that the average level of achievement in spelling of the rural high school students of this sample is low. They lack the ability to spell with accuracy the words taught in the elementary school. However, the spelling ability improves as the

students progress through the high school grades. The girls are significantly better than the boys in all the grades except twelve. In grade nine only, are the bilingual students statistically superior to the unilingual students. The socio-economic factor is definitely significant in determining spelling ability, although the smallness of the sample invalidated the results in the case of the professional group.

All the students make the same type of mistakes, with omission and phonetic substitution the most frequent. The words in the test which are to be found in the Furness 231 High School "Demons" have a higher error of frequency than the words which are found in the Fitzgerald 222 elementary school "demons", which seems to indicate that words change in order of difficulty through the years of school attendance.

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CHAPTER I

THE PURPOSE OF THE STUDY

A popular belief held today is that our high school students cannot spell. Business men deplore the fact that their employees cannot write the simplest words correctly; newspaper editors use the theme for many editorials. All place the blame on the schools for turning out pupils who cannot spell. High school teachers, themselves, complain of the numerous mistakes found in students' written assignments and are the first to admit that their pupils are not able to spell consistently well. This lack of spelling ability is a matter of grave public concern and the concensus of opinion is that something should be done to remedy the situation.

Are these complaints justified? It is generally conceded that they are. Statements of opinion, however, from various sources are not factual enough to enable us to state authoritatively that high school students can, or cannot spell. What is necessary is quantitative proof of these assertions.

The few attempts made to measure spelling ability in the high school are reported in the related studies. In nearly every case the same conclusion is reached; that spelling achievement is low at all levels, elementary, high school and college.

The question which this study seeks to answer is whether the spelling ability of Alberta rural high school students is similar to that of students elsewhere. The students of the high schools

of three rural school divisions were tested for spelling ability and the results analysed.

Spelling as a formal subject is taught to the end of grade eight; thereafter any teaching of spelling is done incidentally. A question that we might ask is how much of this is retained by the pupil? How well do the high school students remember the words that they have been taught to spell in the elementary grades?

Some of the related questions that need an answer deal with the achievement of our bilingual students compared to that of students who come from homes where only English is spoken. It is common practice to blame under-achievement in spelling and other language skills on the fact that English is not spoken at home by the students and their parents. Is this an important factor in the spelling ability of bilingual students?

Several studies have shown that boys do not spell as well as girls of the same age, and the usual explanation is that girls mature earlier than boys and as a result their skill in spelling is better. Is this still true in the later grades of high school when both the boys and girls have reached maturity?

Another reason often advanced for difference in spelling ability among students is the socio-economic factor, or the effect of environment. Illiteracy is sometimes considered as a correlate of low socio-economic status. How do we define the various levels? In the rural areas the population falls quite naturally into four general groups,

determined by the father's occupation, rather than financial competence. These groups are: farmers, proprietors of small businesses, unskilled workers, and professional types. Does the different environment or the different attitudes of these four groups significantly affect the children's spelling ability? Dockrell (4) states in the study on "The Relationship Between the Socio-Economic Status, Intelligence, and Attainment in some Scottish Primary Schools" that "When the I.Q. is held constant there is a significant correlation between E.Q. (English Quotient) and socio-economic status." Since spelling is a factor in English achievement, it might be expected that a difference in spelling achievement will be revealed between the groups from families of varying economic status.

Various studies have been made of spelling errors found in both tests and written work. Thorndike's spelling lists grouped words into the various levels of difficulty for the grades. Lists of the so-called spelling "demons" have been compiled and studies made of the causes of misspelled words. Later studies have shown that words change in difficulty; what is difficult to a student one year gives no trouble later on and vice versa. What words do high school students most frequently misspell? Do these words change as the student matures? Furthermore we ask why are some students weak in spelling? In addition to lack of knowledge of how to spell it has been suggested that an indifferent attitude, laziness, carelessness and poor

handwriting all contribute to poor spelling achievement.

CHAPTER II

REVIEW OF RELATED LITERATURE

A survey of the related literature reveals that there are two broad fields of investigation; one in which the researchers are measuring spelling ability at various levels of the school population, and the other in which spelling errors are analyzed and the reasons for misspelling are sought. The basic reference for spelling research is the section on "Spelling" by Ernest Horn in the Encyclopedia of Educational Research.

In 1948 Oliver Harris (14) investigated spelling achievement of 1235 pupils in grades seven to twelve inclusive in a Pennsylvania high school. He used a dictation- type test of 195 words selected from a graded word list ranging from the grade two level through high school. The mean scores were computed and an achievement grade for each student established. He found the individual spelling achievement of these junior and senior high school students ranged from below grade two to a substantial high school level. The average achievement was low, four grades below the actual grade. Harris observed that systematic study tended to accelerate progress in spelling achievement.

In 1951 Doris Hageman (13) and H.R. Laslett undertook a similar investigation of the spelling ability of 204 high school students divided among the four high school grades. The test itself

consisted of 320 words widely used in speech and writing. The words were dictated in groups of twenty words on sixteen successive days to several representative classes in English. The mean of misspelled words for the entire pupil population was eighty or twenty-five per cent, with a range of from two to 275 misspelled words. In the summary of results the authors cite carelessness and laziness as probably the most common cause of spelling weakness, ... "especially among poor spellers with high I.Q." The investigation also showed that girls are better spellers than boys, and that spelling improves through the high school grades.

Dorothy M. Knoell and Chester W. Harris (18) attempted to find out by factor analysis if spelling is a single ability. They administered combination recognition and completion type tests which would yield three independent and several combinations of scores. They found there appears to be a general spelling ability factor which is measured by most tests. However, another factor which enters into the recognition type test is the habit of excessive checking, which may yield a high score under this type of evaluation.

David H. Russell (22) has undertaken several studies to determine the characteristics of good and poor spellers. He matched two groups of superior and inferior spellers and then matched them for eighteen different abilities, including auditory and visual achievement and Thurstone's primary mental abilities. He found that the former two abilities are closely related to spelling ability in the earlier

years, but not so closely in the junior high school grades. He also found that poor spelling is not necessarily a result of deficiencies in reading and vocabulary. Word recognition and vocabulary ability seem more closely related to spelling ability than to level of comprehension in reading, but correlation is high between spelling and all these factors.

The various studies analyzing spelling errors agree on general classifications. These include phonetic errors, inversion, doubling, homonyms, omission, garbling and confusion. However, the investigators do not agree on the order of importance. For example, Amy L. Livingston (20) analyzed spelling errors and decided that the most important cause of errors is confusion of words, followed by omission. Mildred Swearingen (26) found that omission is the most important cause, followed by phonetic substitution.

Robert L. Coard (2) approached the problem in another way. He asked two classes of forty freshmen to analyze the cause of their misspellings. None suffered visual or hearing defects. It is surprising to find indifference was the most common reason given by the students for their errors. Carelessness, indifferent and incompetent teachers, poor pronunciation, and confusion of common words follow in that order.

An experiment in teaching spelling is recorded by Dwight L. Burton (1) in "Spelling Can Be Taught to High School Students." He gives the results of a study with three grade twelve classes.

All classes were equal on a Stanford-Binet Intelligence Test and on a special spelling test of seventy-five words compiled from the most frequently listed words found in grade twelve language and spelling lists, and from a list of the words that gave the grade twelve students most trouble. Each class was taught spelling by a different method for three months.

Class I used the 5-step plan of Fitzgerald (5) to learn thirty words a week, with a weekly test. Class II studied one spelling rule a week with occasional weekly periods used for testing and review. Class III studied spelling "incidentally" by keeping and learning individual lists of troublesome words. In the weekly spelling period they studied their own lists without any particular plan suggested by the teacher. Occasional test and study sessions were held on words that gave trouble to a number of the class members.

When the second test was given after three months, the results showed no statistical superiority for any of the three methods. The Class I final mean score was significantly better than the mean score on the first test. The other two groups failed to reach this level of significance although there was definite improvement. Burton concluded that this study indicated the benefits of systematic instruction in spelling and suggested that a plan for attacking words for spelling mastery is beneficial.

Another popular explanation of why today's students cannot spell is that phonetics are no longer taught. Many are quite sure this is the only valid explanation. Ernest Horn (16) attempted to disprove

this in a study of English words. For every phonetic rule there are dozens of words that are exceptions. He explained that these rules might have been true many years ago but with changing pronunciation and differences in regional pronunciation how can rules be formulated that will be of real assistance to a school child? Some rules that might be useful are concerned with consonants, and even here there are pitfalls related to double letters, silent letters, and sounds such as the "F" sound. Horn was forced to conclude that there is no escape from the direct teaching of common words which do not conform in their spelling to any rules. Sister Roberta Wolff (30) in her study of spelling errors found that 41 per cent were non-phonetic in origin. Phonetic errors made up 36.3 per cent of the total, while mechanical errors constituted the remaining 22.7 per cent.

All researchers are convinced that students are not spelling as well as they should and that the remedy lies in more effective teaching and the creation of more favorable attitudes on the part of students and parents. Carl H. Delacato (3) and the faculty of Chestnut Hill Academy, Pennsylvania, carried out a five-year study in an attempt to determine the most effective methods of teaching spelling. The formal method emphasized the number of words learned from published spelling lists and used daily planned lesson periods with frequent tests. The informal method emphasized attitude to spelling, used the pupils' own word lists but had no planned spelling periods and few tests. Knowledge of the words was tested by their use in

creative writing. The intensive method emphasized pride in learning to spell correctly. Lists of difficult words were studied, followed by a testing period. To provide motivation, those who made perfect scores on three successive tests were excused the weekly assignment of using the words in sentences.

These three methods were tested by the entire school staff in many classes, over a long period of time, and the results assessed. None of these methods proved the best, each had its strengths and weaknesses. The most interesting discovery was that a variation of methods produced increased spelling growth. It did not matter which direction the variation took, from formal to informal, or from formal to intensive, it was the variation in methods which produced results. The teachers found that it was important to modify methods to suit the class or the occasion.

Calvin S. Sifferd (25) conducted a survey in 1945 in Illinois to see if students are as proficient in spelling today as they were yesterday. He used the Buckingham extension of the Ayres Spelling Scale first given thirty years ago, and measured the spelling ability of his students against the norms. 921 pupils took part in the test, which was made up of words taken from lists from grades four to eight. He found that only in the case of girls in grade seven were the marks of thirty years ago surpassed by today's students. He found that girls spell better than boys, and he

also noted that words change in order of difficulty in thirty years.

Edna L. Furness and Gertrude Boyd have completed several spelling studies, endeavouring to find why students cannot spell and what they cannot spell. They have made a particular study of spelling demons and published "231 Spelling Demons for High School Students" (9) and another for college students. These lists were made after intensive studies of the work of Leonard Ayres, J.W. Studebaker, Fred Ayers, and Thomas Pollock, all of whom have analyzed words that give difficulty to pupils. A very practical article by Furness and Boyd (10), "Learn to Spell First Words First," showed that "The number of spelling troubles ... at the high school and college level is limited to a few ordinary words." The authors listed these words, found in the "demon" lists of elementary, high schools and colleges. The suggestion is made that if these words were taught systematically and an effort made to learn how to spell them, many spelling errors would be avoided.

Finally, pertinent to this study, is the class of articles to be found dealing in a more general way with the problem of poor spelling. "Who Can Cure the Spelling Sickness?" by Edna L. Furness (11) deals with the related literature on this subject of misspelling in the schools and asks the question "To what extent are the teachers responsible?" It is found that there is little formal teaching of spelling in the high school. Indeed, Dr. Harry Hoffman found the high school teacher knows very little about the teaching of spelling. He believes that regular spelling periods have their place in the

high school.

In this same article the author states that the physical and mental attributes of the child that might be thought to determine how well he spells are not so important as other factors. There is no substantial correlation between spelling and intelligence (.30 - .40) and the positive correlation between spelling and visual acuity decreases in the high school grades. (D.H.Russell,22). A quotation from Edna Lue Furness' article makes a very satisfactory conclusion to this survey of the literature on spelling. "... there isn't anything so wrong with the present generation of spellers that a good teacher and a good dose of teaching at all levels ... can't cure."

CHAPTER III

THE DESIGN OF THE PROBLEM

The Description of the Sample

Three school divisions, Calgary, Three Hills, and Wheatland provided the pupils for the survey. The total high school population of this area, including grade nine, was approximately thirteen hundred. It was not expected that every school would participate in the test but every principal was asked in the hope of gaining a sufficiently large sample from each of the four grades to make the study significant.

Twenty-one schools participated, yielding a total of 568 pupils. Sickness and other reasons prevented forty-three of these from completing the test, leaving a final sample of 525 students. Of these, 203 were in grade nine, 140 in grade ten, 104 in grade eleven, and 78 in grade twelve.

This cannot be called a truly random sample. It is rather an incidental sample, yet it is forty per cent of the total high school population of the three school divisions. Forty-four per cent of the total grade nine pupils, forty per cent of the grade ten pupils, forty per cent of the grade eleven pupils, and thirty per cent of the grade twelve pupils of the three divisions completed the test.

The schools are typical rural schools, situated in a small town, village, or community, the pupils coming from the surrounding farming areas. Four of the schools offer grade nine, two offer instruction

to the grade ten level, three to grade eleven, and the remainder offer the complete high school programme.

The Construction of the Test

The selection of the words. This was to be a dictation type test, since the use of the word in context is the functional approach to spelling. Five hundred words were selected from the spellers of the elementary grades; one hundred from the spellers used in grades two to five inclusive, one hundred from the grade six speller, one hundred from the grade seven speller, one hundred from the grade eight speller, and one hundred from the list of "demons" listed in the grade eight speller. The words were chosen by random sampling. Words that had alternate spellings given, and unusual or trick words were not included. The five hundred words were reduced to four hundred to make the test shorter by omitting every fifth word. A mistake in typing the test caused the omission of words 244 and 344; thus the final test consisted of 398 words.

The construction of the test. Each of the 398 words was put into a simple sentence that would make the meaning clear. The sentences were mimeographed with explicit instructions that would make the administration of the test as uniform as possible. The teacher was asked to read the word, then the sentence, and repeat the word to be spelled once more. He was allowed to answer any questions that would make the procedure clear but not to give any information that would

assist in the spelling of the word. The test was to be given as quickly as possible, taking into consideration the slow workers; and there was to be no repetition. It was suggested that the test be given in units of one hundred words. This is not the best procedure for this type of test, as Harris (14) found in his study that 25 - 50 words to the unit will give the best results. However, in scoring the test papers, it did not appear that the fatigue factor had influenced the results, since there was not a greater incidence of errors towards the end of each hundred words than in other parts.

Purpose and description of the data sheet. To obtain the necessary information data sheets were sent out with the test for each student to fill out and attach to his test. Figure 1 is a reproduction of the data sheet.

The answers to these questions provided the information that was required for the sub-problems dealing with sex, bilingualism, and the socio-economic factor. The teacher was asked to give the I.Q. or mental age of each student. This item proved useless for the purposes of the study, as in many cases no I.Q. was available; in other cases it was an estimated I.Q. or the I.Q. resulting from the administration of a variety of intelligence tests, or the percentile rankings given by the Department of Education from the grade nine examination results.

SPELLING TEST

DATA SHEET

TO BE FILLED IN BY PUPIL

NAME .....SCHOOL .....

GRADE .....AGE .....SEX.....

DATE OF BIRTH .....

TEACHER .....

FATHER'S OCCUPATION .....

DO YOU LIVE ON A FARM? .....

IF NOT, WHERE DO YOU LIVE? .....

IS ANY LANGUAGE OTHER THAN ENGLISH SPOKEN AT HOME? .....

IF SO, WHAT IS IT? .....

CAN YOU SPEAK, OR UNDERSTAND ANY LANGUAGE OTHER THAN ENGLISH?

(Do not include the language you may be studying at school).....

.....

To be filled in by teacher.

I.Q. M.A.

Any other comments?

Figure 1. Data Sheet completed by each student.

Scoring the test. The test papers were returned to be marked by the investigator. Although the test was designed to exclude words with alternate spellings, it was pointed out by teachers that since skillful, jewellery, sulphur, and Hallowe'en were given alternate spellings in the Thorndike-Barnhart Dictionary which is recommended for use in the high schools, both spellings were accepted as correct. In the matter of capitals, if the word demanded a capital letter, for example, Christmas or Hallowe'en, it was required if the word were to be scored as correct. In the case of such words as father, and daddy, which may be either common or proper nouns, it was marked correct if it had a capital letter or not. In cases of poor handwriting the student was given the benefit of the doubt wherever possible.

The purpose and use of the data. The number of errors made constituted the pupil's score. These scores were arranged in five frequency distributions, one for the group as a whole and one for each grade. From these distributions achievement was expressed in terms of mean scores and standard deviations. Ten frequency distributions were arranged on the basis of bilingualism or unilingualism and grade, ten by dividing the pupils in the total group and by grades on a sex basis, and four by separating the pupils into four socio-economic groups. In each case the significance of the difference of the means was ascertained by assuming the Null Hypothesis and referring the critical ratio to Fisher's "t" from Table D in Garrett (12). The variances were tested for homogeneity

by use of the variance ratio and Table F in Garrett. In cases where it was found that the difference of means could have arisen from a difference in samples, the Cochran and Cox test was used to determine if the difference in means was truly significant.

The analysis of gross data. This was carried out by taking 130 test papers from three high schools, approximately twenty-five per cent of the entire group, and counting the frequency of error of each of the 398 words on the test. These frequencies were broken down into the errors made by each of the four grades and expressed as percentages of the grade population. The total frequency of error was expressed as a percentage of the entire group.

The third part of the study was a diagnostic study of certain errors in an attempt to find how students misspell words.

CHAPTER IV

AN ANALYSIS OF THE ERROR FREQUENCY OF THE TEST WORDS

In order to find out which words were most frequently misspelled by the high school students in the study, a sample of the 525 test papers was taken and the error frequency found by actual count. The sample consisted of 130 test papers, or twenty-five per cent of the entire test, from the students of three high schools chosen in alphabetical order. This is not a random sample and this fact must be borne in mind in assessing the results of the analysis.

On the following pages may be found the words of the test, with the frequency of error expressed as a percentage of the grade or the total group.

The words are separated into five groups. The first group consists of words from the spellers of grades two to five inclusive, the second group from the grade six speller, the third group from the grade seven speller, the fourth group from the grade eight speller, and the fifth group from the list of "demons" from the grade eight speller.

The words most frequently misspelled were compared with a list of spelling demons compiled by Fitzgerald from the words most frequently misspelled in the elementary school (6) and with the 231 demons compiled by Furness for high school students. The former are marked by an asterisk (*) and the latter by (#).

No particular pattern emerges from the study, but the error frequency is greatest in grade nine as might be expected and least in grade twelve. It may be noted that the error frequency of grade eleven is greater than that of grade ten. In all grades the frequency of error is a rather formidable proof that this particular group of high school students cannot even spell the words from the grade two speller. In only two groups, the first and fifth, were there words that were spelled correctly by all of the 130 students in the sample. The words in group four, those from the grade eight speller, seemed to give the most difficulty, followed closely by the group five list of "demons". The following table summarizes the findings, giving the number of words in each group misspelled by more than twenty per cent, or one fifth of the sample.

TABLE I

NUMBER OF WORDS MISSPELLED BY TWENTY PER CENT OR MORE
STUDENTS OF EACH GRADE AND THE TOTAL GROUP

	Grades				
Words From	9	10	11	12	Total Group
Group I	9	4	8	4	7
Group II	23	10	16	10	16
Group III	22	12	13	4	13
Group IV	43	25	27	19	34
Group V	19	10	11	13	13

This table shows very definitely that there are many high school students who have not retained the ability to spell even the simple

words that they have been taught in the junior grades. Twenty-one per cent of high school pupils cannot spell the word "mathematics", which they must see every day of their school life on the cover of their text book. This is a very unpalatable fact for a teacher.

The tables which follow list all the 398 words in the spelling test in the five groups. They are arranged in order of error frequency, which is expressed as a percentage of the population for each grade and the total population of 130.

TABLE II

WORDS IN GROUP I TAKEN FROM SPELLERS OF GRADES TWO TO FIVE

Word	Error Frequency Expressed as Percentage of Sample				
	Grade 9 N= 42	Grade 10 N= 34	Grade 11 N= 36	Grade 12 N= 18	Total N= 130
hygiene	67	62	33	44	53
minstrel	57	27	42	50	44
patent	41	11	28	33	28
# anxious	31	21	28	17	26
# governor	40	18	20	11	25
pilot	26	24	22	6	22
Thursday	19	15	20	39	21
# library	19	6	28	-	15
fasten	19	12	8	17	14
awful	19	3	14	11	12
central	24	3	11	6	12
holy	21	6	8	11	12
salad	17	6	17	6	12
dairy	7	9	17	11	11
weapons	19	3	8	11	11
beautiful	21	9	3	-	10

Error Frequency, Group One, continued:

Word	Grade 9	Grade 10	Grade 11	Grade 12	Total
arrived	15	6	6	11	9
riddle	10	6	11	11	9
walrus	12	9	8	6	9
division	7	9	8	6	8
marry	12	6	6	6	8
busy	12	3	6	6	7
colonists	10	-	11	6	7
motor	10	3	6	11	7
across	12	3	6	-	6
fever	7	9	3	6	6
eighteen	7	9	6	-	6
nearer	5	12	6	-	6
beavers	10	9	-	-	5
bucket	15	3	-	6	5
caught	12	-	3	6	5
playground	5	3	8	6	5
regular	10	3	3	6	5
thankful	10	-	6	6	5
avenue	10	-	3	6	5
cherries	10	3	3	-	5
crazy	7	-	6	6	5
join	12	-	-	6	5
# different	10	-	3	-	4
factory	7	3	-	6	4
public	5	3	3	6	4
rather	7	3	3	-	4
area	5	-	8	-	4
babies	5	6	-	-	3
carefully	3	3	6	-	3
digging	7	3	-	-	3
dressed	5	-	3	6	3
nobody	3	6	-	6	3
telephone	5	-	-	11	3
butterfly	3	-	3	6	2
broke	3	6	3	-	2
cities	3	3	3	-	2
everyone	3	3	-	6	2
ready	3	-	3	6	2
powder	7	-	-	-	2
stronger	5	-	-	6	2
slowly	-	3	3	6	2
wear	3	3	3	-	2
money	3	6	-	-	2

Error Frequency, Group One, continued.

Word	Grade 9	Grade 10	Grade 11	Grade 12	Total
driving	5	-	-	-	1.5
group	-	6	-	-	1.5
killed	3	-	3	-	1.5
mine	-	-	3	6	1.5
bang	-	-	3	-	1
company	-	-	-	6	1
copper	-	-	3	-	1
drink	-	-	-	6	1
railroad	-	-	3	-	1
island	3	-	-	-	1
showed	-	3	-	-	1

The following words: class, belong, bill, bright, drove, pay, summer, should, world, were correctly spelled by all the students in the sample. In the above table, it seems that all the grades spell even the simple words badly. It is amazing that six per cent of the grade twelve pupils in the sample cannot spell the word "drink".

TABLE III

WORDS IN GROUP II TAKEN FROM THE SPELLERS OF GRADE SIX

Word	Error Frequency Expressed as Percentage of Sample				
	Grade 9 N = 42	Grade 10 N = 34	Grade 11 N = 36	Grade 12 N = 18	Total N = 130
men's	48	38	42	39	43
scissors	45	35	39	50	42
chorus	45	18	22	33	30
theirs	38	18	34	28	30
advice	36	24	28	28	29
dough	45	32	11	17	28

Error Frequency, Group II, continued.

Words	Grade 9	Grade 10	Grade 11	Grade 12	Total
elementary	38	24	28	17	28
greasy	17	41	28	11	25
parliament	48	12	8	17	23
declaration	38	21	14	6	22
parachute	21	15	31	22	22
sandwiches	31	24	8	22	22
cupboard	24	24	22	11	22
cord	21	12	22	33	21
multiplication	34	9	22	11	21
waist	26	21	20	6	20
view	36	15	8	5	18
abundant	26	15	14	11	17.5
wrap	17	18	17	11	16
ample	24	12	14	11	16
rifle	17	6	22	22	16
fountain	19	9	20	11	16
calves	15	3	25	17	15
puzzle	19	6	22	6	15
beautiful	24	9	6	17	14
provincial	21	18	8	-	14
secure	24	6	8	6	14
instrument	24	-	14	11	13
altogether	19	-	11	22	12.5
celery	17	9	14	6	12.5
pocketbook	15	9	8	17	12
radiator	15	9	8	6	10
reserves	17	3	8	11	10
attend	24	3	3	-	9.5
froze	7	12	11	6	9.5
geese	15	-	11	6	9
welfare	10	9	8	6	9
beauty	7	6	14	6	8
limb	17	3	3	6	8
alarm	10	3	8	6	7
blanket	10	3	8	6	7
fudge	12	3	6	6	7
happier	10	6	3	6	6
melts	5	6	6	11	6
pennies	15	-	3	6	6
ponies	7	6	6	6	6
quilt	10	3	3	6	6
varnish	7	9	3	6	6

Error Frequency, Group II, continued.

Words	Grade 9	Grade 10	Grade 11	Grade 12	Total
dictionary	10	3	6	6	6
cones	5	6	6	6	5.5
electric	10	3	3	3	5.5
improvement	12	3	3	-	5.5
plain	5	3	6	11	5.5
burnt	10	-	6	-	5
cabbage	10	3	3	-	5
major	10	3	-	6	5
switch	7	-	3	11	5
crank	3	6	6	-	4
indoors	5	-	8	-	4
rub	5	3	6	-	4
spray	3	-	8	6	4
spoil	5	3	3	-	3
tablets	5	-	3	6	3
unable	3	3	3	6	3
unloading	5	3	-	6	3
whoever	-	6	6	-	3
branch	-	3	3	6	3
confederation	3	-	3	6	2
essay	3	-	3	6	2
highest	-	3	3	6	2
object	3	3	3	-	2
outline	3	3	3	-	2
red	3	-	6	-	2
sandy	3	3	-	6	2
simple	5	-	-	6	2
leaving	5	-	-	-	1.5
navy	3	-	3	-	1.5
sample	3	-	3	-	1.5
sunshine	-	-	6	-	1.5
grounds	3	-	-	-	1

There were no words spelled correctly by all the students in the sample. Again, no particular pattern of misspelling can be seen, all grades having similar difficulties. The fact that some students in grade twelve cannot spell even the simple words suggests indifference and carelessness.

TABLE IV

WORDS IN GROUP III TAKEN FROM GRADE SEVEN SPELLERS

Words	Error Frequency Expressed as Percentage of Sample				
	Grade 9 N = 42	Grade 10 N = 34	Grade 11 N = 36	Grade 12 N = 18	Total N = 130
jewellery	71	53	50	56	58
raisins	57	56	50	40	53
# peculiar	57	24	44	17	39
presence	42	38	22	22	33.5
petals	34	29	28	17	28.5
practically	45	27	20	6	28
commercial	36	32	20	11	27
available	45	9	20	11	24
troops	34	15	22	17	23
height	31	21	22	6	22
recognition	26	24	22	11	22
safety	29	15	20	28	22
sulphur	31	21	22	6	22
# disappeared	21	24	14	11	18
prisoner	31	12	11	17	18
suggest	17	24	17	11	17.5
generally	26	15	14	6	17
nervous	29	18	3	11	16
weighed	24	9	17	11	16
ancient	19	6	14	17	14
happily	24	6	17	-	14
impossible	28	9	8	-	14
opposite	19	3	17	17	14
connected	21	3	14	11	13
justice	17	9	14	11	13
search	19	6	17	6	13
communication	15	15	11	6	12
easily	19	9	11	6	12
territory	19	6	14	6	12
throne	21	6	11	6	12
barber	10	15	6	17	11
olives	17	3	11	6	10
pears	12	6	6	17	10
political	19	3	6	6	9.5
experience	10	9	8	11	9.5
agriculture	19	3	3	6	9
listened	12	6	6	11	9
certain	15	6	3	6	8
copies	10	-	14	6	8
depth	10	6	11	-	8

Error Frequency, Group III continued.

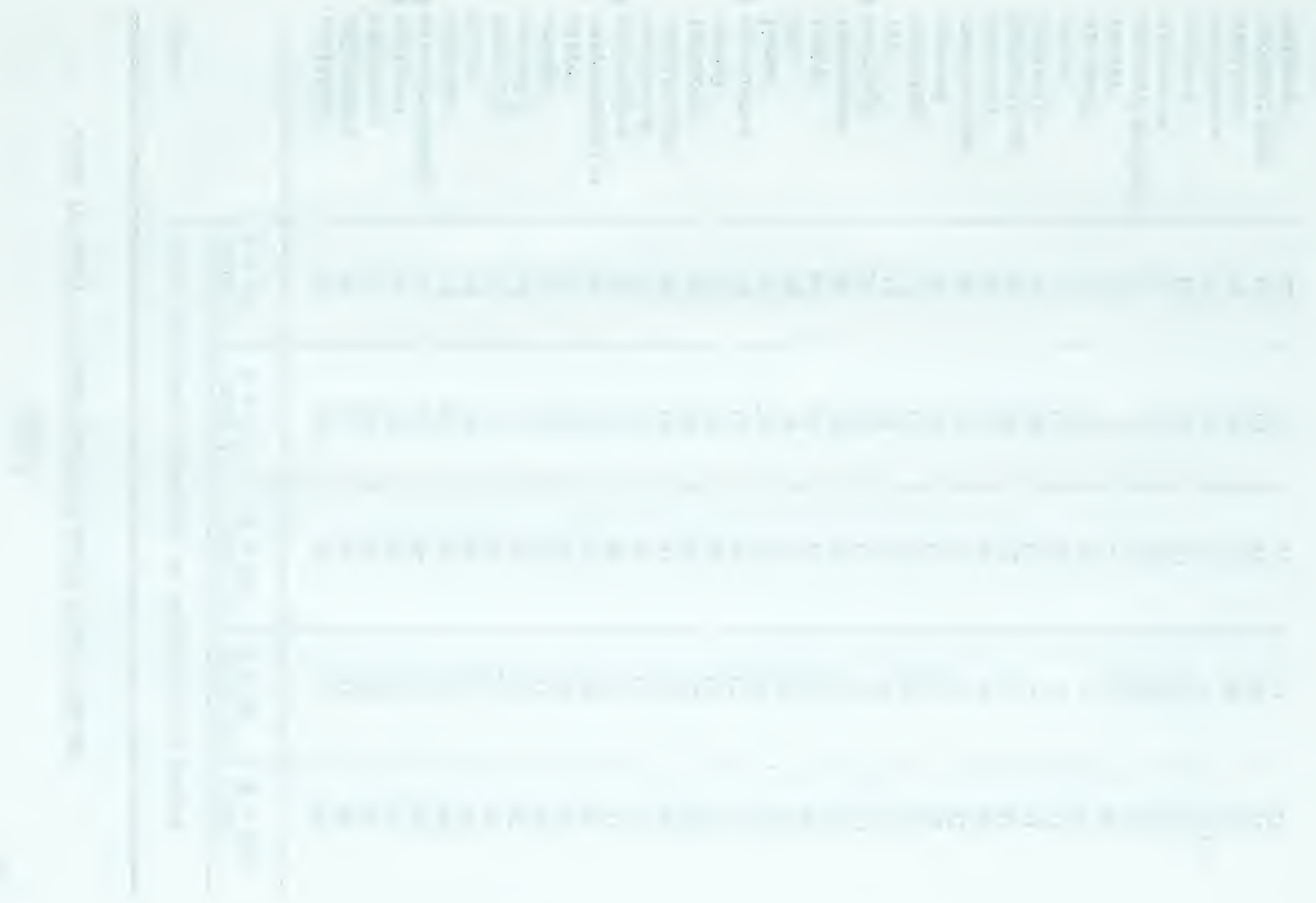
Word	Grade 9	Grade 10	Grade 11	Grade 12	Total
adopted	15	6	3	-	7
example	7	6	8	6	7
manufacturing	10	9	3	6	7
temperature	12	6	3	6	7
judge	12	-	6	6	7
system	10	6	6	-	6
barley	5	3	8	6	5.5
foundation	12	3	-	6	5.5
property	5	3	6	11	5.5
refuse	10	-	6	6	5.5
republic	5	3	6	11	5.5
appointed	12	3	3	-	5
cells	5	3	8	-	5
guide	5	-	8	6	5
liquid	7	3	3	6	5
pudding	12	3	-	-	5
purple	5	3	8	-	5
bulk	5	3	3	3	4
generation	7	-	4	6	4
growth	7	3	3	-	4
lifted	10	-	-	6	4
peace	10	-	-	6	4
sickness	5	3	6	-	4
singers	7	-	6	-	4
weaker	10	3	-	-	4
bulb	7	-	-	6	3
diamond	5	-	3	6	3
digest	7	-	3	-	3
exchange	5	-	6	-	3
glance	3	3	3	6	3
rider	-	3	6	6	3
stem	5	3	3	-	3
task	3	-	3	6	2
total	3	3	-	6	2
wireless	5	3	-	-	2
younger	3	6	-	-	2
bodies	-	6	-	-	1.5
subway	3	-	-	-	1.5
northern	-	-	-	6	1
proper	3	-	-	-	1

The frequency of error is increasing as the words become more difficult. Jewellery was misspelled by fifty-eight per cent of the total group, and by seventy-one per cent of grade nine.

TABLE V

WORDS IN GROUP IV TAKEN FROM THE GRADE EIGHT SPELLER

Words	Error Frequency Expressed as Percentage of Sample				
	Grade 9 N = 42	Grade 10 N = 34	Grade 11 N = 36	Grade 12 N = 18	Total N = 130
auxiliary	76	62	70	72	70
chloroform	74	53	50	33	56
courteous	67	29	42	56	48
# equipped	45	35	47	67	45
# superintendent	62	29	44	33	44
specimen	45	59	36	33	44
weird	45	24	62	50	44
heartily	55	38	42	39	44
grateful	62	24	42	22	41
wrought	55	35	28	33	39
pierce	52	27	34	39	38
representative	40	35	34	17	34
# principles	31	32	36	17	31
complexion	38	35	22	17	30
magnificent	36	18	31	33	29
foremost	36	27	22	33	29
rascal	36	27	22	17	27
# appearance	34	18	25	17	25
liquor	26	18	22	39	25
rosy	29	9	25	39	24
traits	42	18	11	17	24
threatened	24	29	22	17	24
# marriage	31	32	14	6	23
fir	19	21	20	39	22
skeleton	29	15	25	17	22
quarrel	31	21	17	11	21
respiration	40	15	11	11	21
boundary	26	15	28	6	21
mathematics	29	24	11	11	21
naturally	36	18	17	-	21
cedar	36	15	14	6	21
distinct	34	15	20	-	20
relief	34	9	17	17	20
unconstitutional	31	9	17	23	20
elaborate	21	12	20	28	19
meadows	19	21	17	17	18
conference	24	21	14	6	17.5
studious	21	24	8	11	17
accomplished	19	18	17	14	17
skinned	21	12	17	17	17



Error Frequency, Group IV, continued.

	Words	Grade 9	Grade 10	Grade 11	Grade 12	Total
#	opinion	17	18	17	17	17
	wreck	21	21	6	17	16
#	handsome	21	12	17	6	15.5
	kidnapped	17	9	20	11	15
	writer	24	9	11	11	15
	circulation	21	15	8	6	14
	doubt	21	6	14	11	14
	dreadful	15	15	11	17	14
	fifteenth	12	18	14	11	14
	northwestern	17	12	14	11	14
	interview	19	12	6	17	13
	guests	12	9	17	17	13
	tombs	21	6	6	11	12
	ability	19	9	6	6	11
	provisions	17	6	6	17	11
	abolished	24	3	3	6	10
	funniest	15	9	6	11	10
	baggage	12	6	11	6	9.5
	skilful	7	6	6	22	9
	chairman	12	6	3	6	8
	managed	15	6	3	6	8
	calcium	12	3	6	6	7
	strait	12	9	3	-	7
	breed	7	3	6	11	6
	graduated	7	6	6	6	6
	policy	7	3	6	11	6
	reside	10	3	6	6	6
	incorrect	7	6	3	6	5.5
	salesman	7	3	6	6	5.5
	suitcase	5	6	6	6	5.5
	blessings	3	-	8	11	5
	following	16	3	3	-	5
	trout	5	3	3	11	4
	canning	7	-	3	6	4
	planet	5	-	6	6	3
	underline	3	3	3	-	2
	movement	3	3	-	-	1.5
	tide	-	3	-	-	1
	sunrise	-	-	3	-	1

This is the group of words that the students found the most difficult. The average frequency of error for the seventy-nine words is 20.4 per cent for the total sample, while the mean for group III

is 11.3 per cent, for group II it is 7.3 per cent, and for group I, 6.6 per cent. In this group IV there are seven of the Furness 231 spelling demons, and all seven have a high percentage error frequency in this test.

TABLE VI

WORDS IN GROUP V TAKEN FROM THE GRADE EIGHT SPELLING DEMONS

Words	Error Frequency Expressed as Percentage of Sample				
	Grade 9 N = 42	Grade 10 N = 34	Grade 11 N = 36	Grade 12 N = 18	Total N = 130
* Hallowe'en	80	62	55	50	66
stationery	71	53	44	67	58
* handkerchiefs	64	27	50	50	48
# grammar	48	44	22	39	44
# separate	55	27	50	39	44
# argument	40	24	34	61	37
# disappearance	50	27	34	17	35
# receive	52	29	11	22	31
# decided	29	15	25	22	23
# ninety	26	27	22	6	22
# studying	26	18	28	11	22
# development	24	12	25	17	20
how's	29	21	14	11	20
# loose	24	12	14	28	19
# believed	31	3	8	28	17
# probably	34	6	11	11	17
tear	19	18	17	11	17
*# it's	24	18	11	6	16
* I'm	19	12	17	6	15
break	19	6	8	22	13
Christmas	17	9	11	17	13
# clothes	19	12	14	-	13
# minute	19	6	11	17	13
paid	12	12	17	11	13
# quiet	10	9	3	11	13
# knowledge	21	-	11	11	12
* maybe	24	6	6	-	11
# usually	17	6	11	6	11
says	12	3	6	22	9
*# friend	10	3	3	17	7
# government	10	9	6	-	7
* hospital	10	6	8	-	7
* isn't	12	3	6	6	7

Error Frequency, Group V continued.

Word	Grade 9	Grade 10	Grade 11	Grade 12	Total
* remember	12	6	3	6	7
*# weather	3	15	6	6	7
* daddy	7	3	8	6	6
# finally	7	-	8	11	6
seemed	10	6	3	6	6
* sure	12	-	3	11	6
*# their	12	6	3	-	6
*# written	10	6	3	6	6
* always	10	3	8	-	6
cough	10	3	3	6	5.5
raise	12	3	3	-	5.5
* address	3	-	14	6	5.5
* awhile	10	3	6	-	5
doctor	5	3	3	11	5
* lessons	-	6	6	11	5
* o'clock	7	6	3	-	5
sometimes	10	3	3	-	5
# answer	5	-	6	6	4
before	5	6	3	-	4
* bought	10	3	-	-	4
perhaps	3	-	3	6	4
player	7	3	-	6	4
heard	3	-	3	11	3
along	3	-	3	6	2
* cannot	-	-	3	-	2
* can't	3	-	3	6	2
* loving	3	3	3	-	2
* our	3	3	3	-	2
*# there	5	-	-	6	2
* thought	3	3	-	6	2
* anyway	5	-	-	-	1.5
country	-	3	3	-	1.5
* every	5	-	-	-	1.5
* football	-	-	3	6	1.5
* having	3	-	-	6	1.5
* much	-	-	-	5	1.5
* father	-	-	3	-	1
* hour	-	-	3	-	1
* like	-	3	-	-	1

Hallowe'en and handkerchiefs, which have a very high frequency of error, are found in Fitzgerald's list of elementary school spelling

demons; except for these two, the words with the highest error frequency in group V are to be found in Furness' list of 231 high school "demons". Those with the lowest error frequency are to be found in Fitzgerald's 222 elementary school demons. This supports Sifferd's (25) assertion that words change in order of difficulty through the years.

CHAPTER V

THE DATA OBTAINED FROM THE FREQUENCY DISTRIBUTION

The Description of the Curve

The curve obtained from plotting the scores against the frequencies was apparently skewed. (Fig. 2). The measure of skewness was obtained by substituting for the percentile scores in the formula

$$S_k = \frac{P_{90} + P_{10}}{2} - P_{50}$$

where $S_k = 18$; $P_{90} = 5$, $P_{10} = 95$, and $P_{50} = 32$.

The significance of this value for S_k was found by estimating the standard error for S_k by substituting in the formula

$$S.E._{sk} = \frac{.5185\ (P_{90} - P_{10})}{N}$$

where N= 525. This value for the $S.E._{sk}$ is 2.03 and the Critical Ratio (S_k / $S.E._{sk}$) is 18 /2.03, or 8.6, a value far beyond $\pm$ 1.96, the .05 level of significance. The curve is therefore significantly skewed. The skewness is positive, which means the scores are piled up at the lower end of the distribution. This is encouraging for a spelling test, because it means that a large number have low error scores. The long "tail" of the curve, (Fig. 2) represents the poor spellers. It is the tail which gives the skewness to the curve as it approximates the normal pattern to the point on the curve where the errors equal 40, and the frequency equals 20.

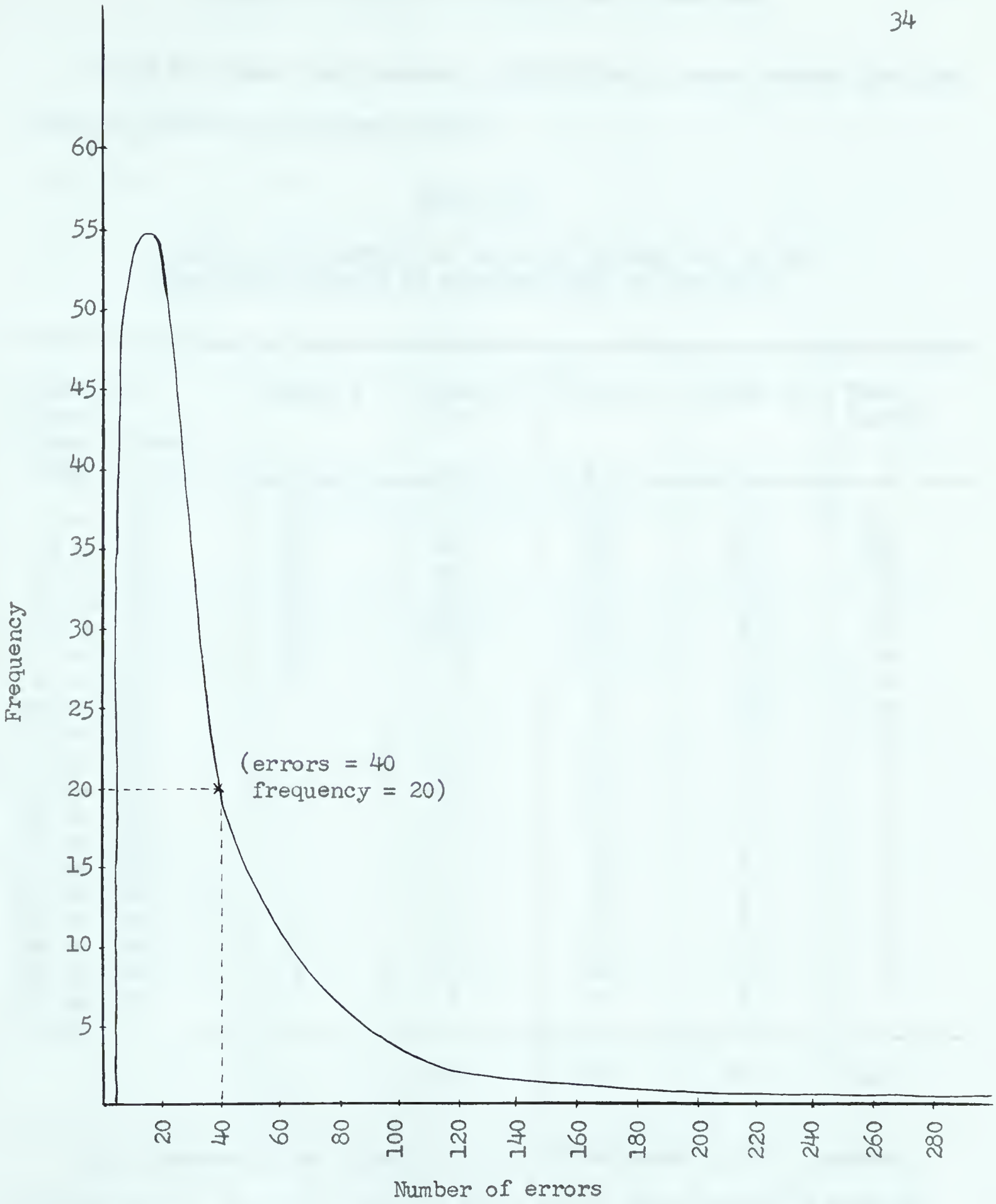


Fig. 2 Smoothed curve of the distribution of error scores, showing positive skewness.

Measure of Central Tendency and Dispersion

Table VII shows the frequency distribution of error scores for the group as a whole and for each grade.

TABLE VII

FREQUENCY DISTRIBUTION OF SPELLING ERRORS MADE BY 525 HIGH SCHOOL PUPILS ON SPELLING TEST OF 398 WORDS

Number of Errors Class Interval = 15	Grade 9 f	Grade 10 f	Grade 11 f	Grade 12 f	Total Sample f
1 to 14	38	38	25	25	126
15 to 29	31	40	24	26	121
30 to 44	40	22	16	12	90
45 to 59	23	10	15	4	52
60 to 74	12	13	10	6	41
75 to 89	19	8	5	2	34
90 to 104	13	3	3	1	20
105 to 119	7	2	2	0	11
120 to 134	8	1	2	0	11
135 to 149	2	0	1	1	4
150 to 164	2	0	0	0	2
165 to 179	0	1	0	0	1
180 to 194	1	0	0	0	1
195 to 209	0	1	0	0	1
210 to 224	1	0	0	0	1
225 to 239	2	0	1	0	3
240 to 254	2	0	0	0	2
255 to 269	1	1	0	1	3
270 to 284	1	0	0	0	1
N =	203	140	104	78	525

The skewness of the curve is again illustrated by the frequency distributions. In each case, the first three class intervals have by far the largest frequencies. After this they decrease in value very rapidly.

Table VIII shows the mean error scores and standard deviations for each group, computed from the frequency distributions of Table VII. The standard deviations are large in all cases, which indicates there is a wide range in the spelling abilities of the individuals comprising the sample. In Table VIII the mean error scores are also expressed as percentages of 398, the number of words in the test, and the converse, the percentage of words spelled correctly.

TABLE VIII

THE MEAN ERROR SCORES, STANDARD DEVIATIONS, PERCENTAGES OF ERRORS AND PERCENTAGES OF WORDS SPELLED CORRECTLY, FROM THE DISTRIBUTIONS OF TABLE VII

Nine	Mean Error Score	Standard Error of Means	Standard Deviation	Mean Errors Expressed in Percentages	Mean of Words Correctly Spelled (Per cent)
Nine N= 203	56.88	3.64	51.75	14.29	85.71
Ten N= 140	36.40	3.05	32.78	9.15	90.85
Eleven N= 104	41.23	4.05	32.21	11.11	88.89
Twelve N= 78	31.60	3.58	36.10	7.94	92.06
Entire Sample N= 525	44.94	1.93	44.26	11.33	88.67

Table VIII shows in terms of mean error scores that there was an improvement in spelling achievement from grade nine to grade twelve, through grade ten. Grade eleven students did not do so well as grade ten students, but did much better than grade nine students; grade twelve students did much better than the other three grades. By

examining the significance of the differences in the means, shown in Table IX, it was found that there was a real significance at the .05 level of confidence in the difference in the means of grades nine and ten, but no significance in the difference of the means of grades ten and eleven. The variances show that these two groups had been drawn from the same population. If we consider grades ten and eleven as one homogeneous group, then we can say that there was a steady increase in spelling ability through the high school grades from grades nine to twelve.

TABLE IX

THE SIGNIFICANCE OF THE DIFFERENCE OF MEANS BETWEEN GRADES

Grades	Mean Score	Difference of Means	Significance
Nine Ten	56.88 36.40	20.48	at .05 level
Ten Eleven	36.40 41.23	4.83	not significant
Eleven Twelve	41.23 31.60	10.37	at .05 level

We should expect to find an improvement in spelling ability as as the student matures. Hageman and Laslett (13) in their study found this to be so and stated that while the I.Q. did not change much from class to class, the spelling ability improved.

Percentile Scores

It is often useful to have a score expressed in terms of percentiles. In Table X we have such a grouping.

TABLE X

PERCENTILES OF DISTRIBUTION, WITH SCORES EXPRESSED AS PERCENTAGES

Percentile	Score Number of Errors	Percentage of Errors
P_{90}	5	1.3
P_{80}	11	2.8
P_{70}	18	4.5
P_{60}	25	6.3
P_{50}	32	8.0
P_{40}	40	10.0
P_{30}	53	13.3
P_{20}	71	17.8
P_{10}	95	23.9

The median, or fifty percentile score, is 32, representing eight per cent of the 398 words. A comparison of the median with the mean of 44.7 shows a great difference in values, again revealing the skewness of the curve of the distribution. The ninety percentile score is five, or ten per cent of the total group have fewer than five errors. The ten percentile score is ninety-five, or the lowest ten per cent have more than ninety-five errors, or twenty-five per cent of the words misspelled.

CHAPTER VI

A COMPARISON OF THE ACHIEVEMENT OF THE STUDENTS OF THE SAMPLE, SEPARATED ON THE BASIS OF SEX, BILINGUALISM, AND SOCIO-ECONOMIC STATUS

In this study, when comparisons were made between scores of two groups, the significance of the difference of the means was determined by the following procedure. The null hypothesis was assumed and the critical ratio of the difference of the means and the standard error of the difference of the means, referred to the "t" of Table D in Garrett. (12). If the null hypothesis was refuted and the difference in the means was shown to be significant, the homogeneity of the variances was tested by using the variances ratio and Table F in Garrett. If the two groups were shown to differ in variability the Cochran and Cox test was used to test the significance of the difference of the means.

Comparison of the Achievement of Boys and Girls

Ten frequency distributions were made consisting of the error scores of the boys and girls in each of the four grades and in the entire group. The means and standard deviations were computed, and the significance of the difference of the means of the scores of the boys and girls determined. It was found there was a significant difference in the spelling ability of the sexes in all grades except twelve, the girls being superior to the boys. In Table XI are shown the mean scores of the boys and the girls in each grade and the total

sample.

TABLE XI

DIFFERENCES IN MEAN ERROR SCORES OF PUPILS GROUPED ACCORDING TO SEX

Grade		Mean	Standard Deviation	Difference of Means	Critical Ratio	Significance
9	Boys N=108	73.60	56.10	35.44	6.58	at .01 level
	Girls	37.16	37.62			
10	Boys N= 68	45.60	46.77	15.26	1.84	at .05 level
	Girls N= 72	30.34	24.69			
11	Boys N= 60	56.50	45.53	33.48	5.01	at .01 level
	Girls N= 44	23.02	18.69			
12	Boys N= 40	38.13	45.33	18.47	2.31	not significant
	Girls N= 38	19.64	21.17			
Total group	Boys N=276	57.33	50.56	26.58	7.39	at .05 level
	Girls N=247	30.75	29.36			

In grade nine, with homogeneous variances, the difference is significant at the .01 level of confidence. In grade ten, although the variances differ significantly, the Cochran and Cox test shows the differences to be significant at the .05 level of confidence. The

difference is significant at the .01 level in grade eleven. There is no significant difference in the achievement of the boys and girls in grade twelve. In the entire group, the difference between the achievement of the boys and girls is significant at the .05 level of confidence, the girls being superior to the boys. From the table it would seem that the boys made almost twice as many mistakes as the girls in this test.

An interesting fact becomes apparent from the scores. In grade eleven, the proportion of boys and girls is much greater than in the other grades. As the boys' mean error score is much larger than that of the girls, it has the effect of weighting the mean score for the grade and as a result we have the observed decline in spelling ability in grade eleven seen in Table VIII. Table XI shows that the spelling ability of the girls steadily improves through the four high school grades; it is the boys who deteriorate in grade eleven.

The standard deviations of the boys' scores are much greater than those of the girls, showing the range of ability to be greater in the case of the boys.

The Effect of Bilingualism on Spelling Achievement

Ten frequency distributions were made by separating the scores of the bilingual pupils from the unilingual pupils in each grade and in the entire group.

In every case the mean scores of errors were lower for the bilingual students. However, when we test for significance we find

that the only group with a significant difference in the mean scores is the grade nine group. Here the bilingual students achieve better.

Table XII shows the various measures obtained from the ten distributions.

TABLE XII

COMPARISON OF MEAN SCORES OF 135 BILINGUAL HIGH SCHOOL PUPILS WITH THOSE OF 390 UNILINGUAL HIGH SCHOOL PUPILS

Grade		Mean	Standard Deviation	Critical Ratio	Difference of means	Significance
9	Bilingual N=49	49.15	50.24	2.45	10.06	at .05 level
	Unilingual N=154	59.21	52.05			
10	Bilingual N=32	34.66	32.58	.95	4.98	none
	Unilingual N=108	39.64	39.09			
11	Bilingual N= 29	34.93	30.46	1.35	10.27	none
	Unilingual N= 75	45.20	44.78			
12	Bilingual N= 25	24.40	18.28	1.61	10.90	none
	Unilingual N= 53	35.30	41.38			
Total Sample	Bilingual N=135	38.10	37.67	2.41	9.79	none
	Unilingual N=390	47.89	47.18			

From the scores obtained it may be said that the observed difference in spelling ability is due to chance, except in grade nine, when we can expect this difference to occur ninety-five times out of

a hundred spelling tests of bilingual and unilingual students in grade nine.

The levelling effect of progress through the high school grades is once more observed. In comparing the spelling ability of the sexes there is a significant difference in performance of the boys and the girls at the grade nine level which disappears by grade twelve. There is a significant difference between the spelling ability of the bilingual and the unilingual groups at the grade nine level also, which has disappeared by grade ten. There are probably several reasons for this, but it is suggested that the influence of the peer group overshadows the factors that make the differences apparent in grade nine.

Comparison of the Achievement of the Students from Four Socio-Economic Groups

Before this study could be made, the composition of the four groups had to be determined and defined. The farming group, the largest numerically, consisted of the children of all types of farmers; grain farmers, ranchers, dairy farmers, turkey farmers and chicken farmers. The small proprietor group was made up of children of storekeepers, contractors, postmasters, grain buyers, and proprietors of garages, welding shops and carpentry shops. Also included in this group were the children of employees whose work entails a certain amount of business training, such as salesmen. In the unskilled labour group were the children of

farm-workers, road-workers, truck drivers, bus drivers, and workers on construction projects. In the very small professional group were the children of ministers, teachers, a pharmacist, and a few bankers. In Table XIII are the results of the spelling test for these groups.

TABLE XIII

MEAN ERROR SCORES MADE BY 506 HIGH SCHOOL PUPILS GROUPED ON A SOCIO-ECONOMIC BASIS

Group	Mean Score	Standard Deviation	S.E.mean
Children of Farmers N = 356	46.99	46.78	2.48
Children of Professional Men. N = 16	34.25	53.96	13.49
Children of Small Proprietors N = 67	36.78	33.17	4.05
Children of Unskilled Workers. N = 67	42.37	31.17	3.87

From the table the children of the professional group have the lowest mean error scores, followed by the children of the small proprietor group, the children of the unskilled workers, with the children of the farmers having the largest mean error scores. In the case of the professional group, the sample is so small (16) that little confidence can be placed in the results. The standard deviation is much larger than the mean and the standard error of the mean is 13.49.

In Table XIV the difference in the means of the four groups is compared in six paired combinations.

TABLE XIV

DIFFERENCE OF MEANS AND CRITICAL RATIOS OF SOCIO-ECONOMIC GROUPS

Groups Compared	Difference of Means	S.E.$_{m-m}$	Critical Ratio	Significance
1. Farmers and Professional Group	12.74	13.71	.93	not significant
2. Farmers and Small Proprietors	10.20	4.75	2.15	significant at .05 level
3. Farmers and Unskilled Workers	4.62	4.60	1.00	not significant
4. Professional Group and Small Proprietors	2.53	14.30	.17	not significant
5. Professional Group and Unskilled Workers	8.12	15.39	.52	not significant
6. Small Proprietors and Unskilled Workers.	5.60	5.60	1.00	not significant

In the case of the farmers and professional group, and the proprietors and unskilled worker groups, the F-test shows these two pairs of groups to have comparable variability, but in the other pairs,

the variances differ greatly. Applying the Cochran and Cox test and comparing the observed "t" with the criterion "t" we find that only in the case of the farmers and the small proprietors is the difference in mean error scores significant, and then only at the .05 level of significance. In all the other cases the difference in achievement of the children from these socio-economic groups is not proven significant.

CHAPTER VII

AN ANALYSIS OF THE TYPES OF SPELLING ERROR FOUND IN THE TEST

The spelling errors made by the 130 students whose test papers were used for the error frequency count in Chapter IV were classified according to the type of error. It would have been a very lengthy undertaking to study every error on each paper, therefore the analysis was confined to the types of error made in spelling the ten words with the greatest error frequency in the test. These words are shown in Table XV together with the various types of error found in spelling each word. The total errors made by the 130 students in spelling these ten words was 555, and eight types of error were found.

TABLE XV

AN ANALYSIS OF SPELLING ERRORS MADE BY 130 STUDENTS IN SPELLING TEN WORDS

Words	Types of error							
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
hygiene	3	35					5	10
jewellery	14		28	15			1	
auxiliary	25		28	10			7	
courteous	12	26					10	
chloroform	16	21		13			6	
equipped	1	14	29				1	
Hallowe'en	4		10	6		45	1	
handkerchiefs	32	13					1	2
raisins	12			38				3
stationery					55		3	
Totals	119	109	95	82	55	45	35	15

The errors represented in the table are, in order of frequency; (a) omissions, (b) phonetic errors, (c) doubling, (d) errors due to mispronunciation, (e) homonyms, (f) technical errors, capitalization, hyphenating, and misuse of apostrophe, (g) garbling, (h) inversion.

The most frequent type of error found in this study was the omission of letters, and this was found in the spelling of all the ten words except "stationery". The second greatest cause of error was the phonetic spelling of words. These are usually substitutions of similar sounding letters. In the word "chloroform", "ph" was substituted for "f" to provide most of the errors. Similarly, "handkerchiefs" was spelled with "ve" in place of "f", and "equipped" was spelled "equipt". Swearingen (26) found in her study that omission and phonetic substitution were by far the most frequent type of error. Wolff (30) states that phonetic-type errors centre on the hard spots, and non-phonetic errors are due to lack of knowledge of the word. Livingston (20) found that omissions and confusion (substitution) were found more in the errors of the lower quarter of the group that she tested, while the higher quarter made more errors in transposition (inversion) and doubling. The fact that in this sample, the most frequent types were omissions and phonetic errors, supports Swearingen.

The spelling errors found in this sample, are not of the type that can be remedied by learning spelling rules. In the words "jewellery" and "equipped" the consonant is doubled before the suffix, but in "auxiliary" there is the single consonant. This confused the

student and caused most of the spelling errors in these three words. It was noticed in marking the papers that the students had spelled "chloroform" with a "ph" modelling it on "chlorophyll" which they had written in the margin of the paper. Horn states "... little justification is found for the claim that pupils can arrive deductively at the spelling of most words they can pronounce." (16) The teaching of a multitude of spelling rules has therefore little value.

CHAPTER VIII

CONCLUSIONS

This spelling test was designed to measure the ability of rural high school students to spell words which they had studied in the elementary grades. It seemed proper to expect a reasonably high level of proficiency in spelling these words. It was found instead that the level of attainment of high school students was surprisingly low. The major findings of the study follow.

1. Rural High School Students Are Poor Spellers. We find from the frequency distribution that only 308 of the 525 students, or fifty-nine per cent, were able to spell ninety per cent of the test words correctly. Forty-one per cent of the rural high school students in the study fail to reach the ninety per cent level of accuracy.

There were some good spellers, but not enough. There was none with a perfect score. One grade twelve girl, who spoke German as well as English, had but one error; she failed to spell "men's" with an apostrophe. Twenty-one of the students, or four per cent, had four or less mistakes, or ninety-nine per cent accuracy; and seventy-one, or thirteen per cent, of the students had ninety-eight per cent accuracy.

2. Spelling Ability Improves Through the High School Grades. There was gradual improvement in spelling ability from grade nine to grade twelve. From grade nine, with a mean error score of 56.88, we find

spelling improving to the 31.6 mean error score of grade twelve. The grade eleven boys were the only exception to this pattern. Their mean error score was greater than that of grade ten.

We find that fifteen per cent of the grade twelve students failed to achieve as well as the average for grade nine; twenty-seven per cent of the grade eleven students failed to reach this level, and twenty-one per cent of the grade ten students made more mistakes than the average grade nine student.

The most striking feature of the curve of error frequency distribution was the long "tail" made up of the poor spellers. The poorer fifty per cent of the students involved in the study had error scores ranging from 32 to 277. There were twenty students with a mean score of 97 errors, twenty-two with a mean score of 120 errors, three with a mean score of 232 errors, and three with a mean error score of 262. These three students misspelled two out of three words.

3. Girls are Better Spellers than Boys in the Early High School Grades. In grade nine, girls were significantly better than boys in spelling. In grades ten and eleven, the difference is less, but the superiority of the girls is statistically significant. In grade twelve the difference is slight and no longer significant. This difference in spelling achievement of boys and girls confirms the findings of Sifferd (25), Wallin (28),and Hageman and Laslett (13).

4. The Bilingual Students are Better Spellers in the Early High School Grades. There is evidently no valid reason for the language teacher to blame bilingualism for poor results in spelling. In grade nine the bilingual students are significantly better spellers. In the other grades the observed difference is in favor of the bilingual groups, but the small samples in grades ten, eleven, and twelve, make the comparison meaningless. In this study the samples were composed of mixed groups of boys and girls; it would be interesting to carry out a similar study with samples of bilingual boys or girls compared to similar samples of unilingual boys or girls. The sex factor no doubt affects the results of the present study, but the samples were too small to permit separating the sexes. The socio-economic factor is doubtless also active in the spelling achievement of these bilingual students, as a large proportion of them were children of unskilled workers or farmers.

5. The Socio-Economic Factor is Important in Determining Spelling Ability. When the students were grouped according to socio-economic status, the children of the professional workers had the lowest mean score, followed by the children of the small proprietors, the children of the unskilled workers and lastly the farmers. The very small sample of the professional group, sixteen, tended somewhat to invalidate the results of this group. When we test the significance of the difference of the means of the four groups, the only significant difference was between the farmer and the small proprietor groups and in favor of latter.

6. There is little difference in the kind of words misspelled by any of the grades. The only difference is in the proportion of the groups misspelling the words; grade twelve students have a lower mean error score than grade nine. The words found in the Furness high school "demon" list have a higher error frequency than those found in the Fitzgerald 222 elementary school "demons", indicating that the more difficult words in the high school are not those of the elementary school. The types of error made are chiefly those of omission and phonetic substitution, with errors due to doubling and mispronunciation following in close order. In all the grades were students who write so illegibly that the words are undecipherable, and students who misspelled because they seemed indifferent or lazy or both.

To summarize, the rural high school students of this sample cannot spell words taught in the elementary school, although the spelling ability increases as they progress through the high school grades. The girls are significantly better spellers than the boys, and the bilingual groups than the unilingual groups in grade nine only. In the other grades the difference is not significant. The words that give the most trouble in high school are not those that give the most trouble in the elementary school, and most errors are due to omissions and phonetic substitutions.

CHAPTER IX

IMPLICATIONS FOR THE CLASSROOM TEACHER

Many high school students have a very poor attitude to spelling; this could be observed in marking the test papers. Carelessly written, illegible test papers were obviously the result of a "couldn't-careless" attitude on the part of some of the students.

A favorable attitude to accuracy in all written expression which includes correct spelling must be established in the mind of the student before any remedial work can be done. In other words, if the teacher is to improve the spelling achievement of the individuals in his classes, he will need to motivate them with the desire to spell correctly. This in turn will depend on the attitudes of the group to correct spelling. If, by group discussion, the students themselves can be led to decide that correct spelling is a desirable goal, they will have taken the first steps to raise the level of their spelling achievement. Spache (24) says that the school must try to develop a spelling "conscience", a desire to spell correctly; and a spelling consciousness, a critical attitude to one's own spelling.

Having established a favorable attitude to spelling in the mind of the student, the second essential will be continuous emphasis on correct spelling at all times. Not only the language teacher, but all the high school teachers must require correct spelling from the

students in all written work, and must not allow a single spelling mistake to go unchallenged. Formal teaching of spelling has its place, but the learning of rules and long lists of words has proved futile in the past as many authorities believe. A variable approach to the teaching of spelling will provide the best results. Students should be encouraged to seek out their own weaknesses and remedy them. Continuous use of these difficult words in written assignments will prove if the words have been mastered. The fact that "demon" lists contain relatively few words, with many of them common to both elementary and high school grades should suggest the mastery of a core vocabulary of these basic words.

Poor handwriting encourages poor spelling and the student should be motivated to write neatly and legibly. The high error scores in the study were without exception found on badly written test papers, and the authorities are agreed that bad penmanship and a careless attitude to written work are conducive to poor spelling.

The third essential to successful spelling achievement is continuous evaluation. This will provide a goal for the student in seeking the perfect score, and a guide for the teacher in discovering spelling weaknesses in the students. It is desirable that the student should learn to evaluate his own spelling. Skill in proof-reading is valuable to this end. Standardized tests have some value in establishing norms, but more valuable are the tests composed of the words used

and learned in the classroom, and practiced in the written work of the student.

These three items, a favorable attitude, a continuous emphasis on correct spelling with a variable approach, and continuous evaluation will assist the teacher in improving the spelling ability of his students. Because spelling ability is not highly correlated with intelligence, there is no reason why every high school student should not spell correctly.

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